Indian Institute of Technology Patna
CS1101- Foundations of Programming

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. Users and Groups (admin)

1.1 User Management (run as root)

adduser newuser

passwd newuser

deluser olduser

1.2 Group Management

```
groupadd devs

usermod -aG devs username

groups username
```

Package Management

```
sudo apt update

sudo apt install package

sudo apt remove package
```

4Networking

```
ip a                # IP address info
ping google.com     # Test connectivity
netstat -tuln       # Open ports (needs net-tools)
ss -tuln            # Modern alternative to netstat
curl ifconfig.me    # Check public IP
```

Processes and Jobs

```
ps aux              # List processes
top / htop          # Live monitor
kill 1234           # Kill process by PID
jobs                # Background jobs
fg %1 / bg %1       # Foreground/background job
```

Task Scheduling

```
crontab -e          # Edit cron jobs

# Example: Run every day at 5 AM

0 5 * * * /home/user/script.sh
```

Bash Scripting

```
vim file.txt

# i - insert mode, ESC - command mode, :wq - save and exit
```

Disk and Memory Management

- df -h - Disk usage
- du -sh * - Folder sizes
- free -h - RAM info
- uptime - Load average

Advanced Topics

- **SSH**: `ssh user@host`, use `~/.ssh/id_rsa`
- **Disk Partitioning**: `lsblk`, `fdisk`, `parted`
- **LVM**: Logical Volume Manager (advanced partitioning)
- **Docker**: `docker ps`, `docker run`, `docker build`
- **Systemd**: `systemctl status service`, `journalctl -xe`

Customization and Dotfiles

- `.bashrc`, `.bash_profile` – shell startup
- `alias ll='ls -la'`
- `export PATH=$PATH:/new/path`

Security Essentials

```
ufw status

sudo ufw enable

sudo ufw allow 22/tp    # Allow SSH
```

Install Linux using Windows Subsystem for Linux (WSL)

To install Linux using Windows Subsystem for Linux (WSL), which is recommended for beginners, start by enabling the WSL feature. Open PowerShell as an administrator and run the command `wsl --install`. This automatically sets up the WSL environment and installs the default Linux distribution, usually Ubuntu. If you're using an older version of Windows 10, you may need to manually enable the "Windows Subsystem

for Linux" and "Virtual Machine Platform" features using the `dism.exe` command, followed by a system restart. Once WSL is enabled, go to the Microsoft Store, search for your preferred Linux distribution (such as Ubuntu, Debian, or Kali Linux), and click "Install." After installation, launch the Linux application, and complete the initial setup by creating a username and password. You can now use Linux directly from your Windows system, running commands in the Linux terminal and accessing your Windows files under the `/mnt/c/` directory. This method is convenient and safe, as it doesn’t require partitioning your hard drive or modifying your boot settings.